

**Kenneth P. Blemings**

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**Education History**

University of Wisconsin	Post-doctoral experience	1999 Nutritional Sciences (with Dr. Richard S. Eisenstein)
University of Wisconsin	Ph.D.	1994 Nutritional Sciences and Meat & Animal Sciences (Joint) Minor: Biochemistry (with Drs. N.J. Benevenga and T.D. Crenshaw) (minor professor was Dr. J. Suttie)
University of Wisconsin	M.S.	1990 Meat & Animal Science (with Drs. N.J. Benevenga and T.D. Crenshaw)
Virginia Polytechnic Institute	B.S.	1987 Animal Sciences/Biochemistry

**Employment History**

May 2015 – present	Dean of the Honors College, West Virginia University
May 2014 – May 2015	Interim Dean of the Honors College, West Virginia University
May 2012 – June 2015	Intercollegiate Undergraduate Program in Biochemistry, Curriculum Committee, Chair
September 2010 – 2014	Assistant Director of Academic Programs (50% administrative appointment)
July 2010 – present	Professor of Nutritional Biochemistry in the Division of Animal and Nutritional Sciences – West Virginia University
July 2005 – June 2010	Associate professor of Nutritional Biochemistry in the Division of Animal and Nutritional Sciences- West Virginia University
August 1999-June 2005	Assistant professor of Nutritional Biochemistry and of Genetics and Developmental Biology in the Division of Animal and Veterinary Sciences- West Virginia University
December 1994 – July 1999	Post-doctoral experience with <b>Dr. Richard S. Eisenstein</b> , Dept. of Nutritional Sciences at University of Wisconsin-Madison

April 1987 – November 1994

Research Assistant under **Dr. Norlin J. Benevenga**, (Dept. of Nutritional Sciences) and **Dr. Thomas D. Crenshaw** (Dept of Animal Sciences) University of Wisconsin-Madison

### **Teaching Experience**

Introductory Biochemistry -

(AGBI 410) & lab (AGBI 411/411H) Spring 2000-2012; Fall 2002, 2003; (AGBI 411/411H ) Fall 2006& 2007, Spring 2013, 2014

General Biochemistry-

(AGBI 610) Fall 1999-2001, 2004-2013

Orientation to Biochemistry -

(AGBI 199) Fall 2001-2013

Guest lectures on Bioenergetics in Animal Growth and Physiology –

(ANPH 400) Spring 2001 - 2014

Biochemistry Senior Seminar-

(AGBI 494) Spring 2003, 2004, 2006, 2008, 2012, 2013

Advise approximately 70 students in two majors- Animal Science and Biochemistry: 2000-present  
Honor's Advisor 2005 – present

Undergraduate research

Typically have 1-3 undergraduate students in my laboratory conducting undergraduate research, many of these students are from either the Honor's Program or the Davis/Michaels Program or both

### **Honors**

2-year term on the Journal of Nutrition editorial board	April 2001 - April 2003
Outstanding teacher in the Division of Animal and Nutritional Sciences	2001, 2002, 2009, 2010
Outstanding teacher in the Davis College of Agriculture, WVU	2002
Outstanding researcher in the Division of Animal and Veterinary Sciences	2003
Outstanding advisor in the Davis College of Agriculture, WVU	2011
Outstanding Honor's advisor at West Virginia University	2010
WVU Foundation Outstanding Teaching Award	2012
APLU/USDA Regional Teaching Award	2012

### **Professional Societies**

American Society of Nutrition

American Society of Biochemistry and Molecular Biology

### **Invited Talks**

Lysine Catabolism and its Regulation – Bennet Department of Chemistry at WVU September, 2011

Lysine Catabolism and its Regulation – Biology Department Seminar Series  
West Virginia University (October 16, 2006)

Lysine Catabolism and its Regulation – Nutrition Seminar Series

Invited to North Carolina State University (November 2, 2005)

Lysine Catabolism and its Regulation – Animal Nutrition Seminar Series

Invited to Virginia Polytechnic Institute and State University (February 2, 2005)

Lysine Metabolism and its Control- Animal Nutrition Seminar Series –  
West Virginia University (Jan. 2001)

Lysine Metabolism and its Control- Cell and Molecular Biology Seminar Series –  
West Virginia University (Jan. 2001)

Regulation of Lysine Catabolism – West Virginia University – December 3, 1998

Regulation of Lysine Metabolism – University of Wisconsin – Whitewater – November 8, 1996

Lysine Catabolism in Rat Liver – Cornell University – May, 26, 1994

## **Publications**

Gatrell, S.K., Berg, L.E. Grimmett, J.G., Moritz, J.S. & **Blemings, K.P.** Diet-induced alterations of lysine catabolism occur in pig liver, but not kidney or heart –*in preparation*

Gatrell, S.K., Silverstein, J.T., Barrows, F.T., Grimmett, J.G., Cleveland, B.M. & **Blemings, K.P.** (2016) Effect of dietary lysine and genetics on growth and indices of lysine catabolism in rainbow trout (*Oncorhynchus mykiss*) *Aquaculture Nutrition - In press*

Gatrell, S.K., Swiger, B.N., Engels, J.G., Berg, L.E., Barnard, J.T., Moritz, J.S., & **Blemings, K.P.** (2014) Effects of strain and production cycle on indices of lysine catabolism in turkeys. *International Journal of Poultry Science* 13(12):685-694.

Evans, A.M., Swiger, B., **Blemings, K.P.**, Lilburn, M.S. & Moritz, J.S. (2014) The effect of strain and finisher diet non-phytate phosphorus level on performance and litter composition in large tom production. *International Journal of Poultry Science* 13(5):246-252.

Kiess, A.S., Managi, M.K., Cleveland, B.M., Wilson, M.E. & **Blemings, K.P.** (2013) Effect of dietary lysine on hepatic lysine catabolism in broilers. *Poultry Science* – 92:2705-2712.

Gatrell, S.K., Berg, L.E., Barnard, J.T., Grimmett, J.G., Barnes, K.M. & **Blemings, K.P.** (2013) Tissue distribution of indices of lysine catabolism in growing pigs. *Journal of Animal Science* 91:238–247.

Pink, D.B.S., Gatrell, S.K., Elango, R., Turchinsky, J., Kiess, A.S., **Blemings, K.P.**, Dixon, W.T. & Ball, R.O. (2011) Lysine  $\alpha$ -ketoglutarate reductase but not saccharopine dehydrogenase is subject to substrate inhibition in pig liver. *Nutr. Res.* 31:544-554.

Cleveland, B.M., Weber, G.M., **Blemings, K.P.** & Silverstein, J.T. (2009) Insulin-like growth factor-I and genetic effects on indices of protein degradation in response to food deprivation in rainbow trout (*Oncorhynchus mykiss*). *Am J Physiol Regul Integr Comp Physiol.* 297(5):R1332-42.

Carro, M., Falkenstein, E., **Blemings, K.P.**, & Klandorf, H. (2009) Distribution of Xanthine Oxidoreductase Activity in Broiler Tissues. *Poult Sci.* 88(11):2406-14.

Cleveland, B.M., Leonard, S.S., Klandorf, H. & **Blemings, K.P.** (2009) Urate oxidase knockdown decreases oxidative stress in a murine hepatic cell line. *Oxidative Medicine and Cellular Longevity* 2(2):93-98.

Lemley, C.O., Koch, J.M., **Blemings, K.P.** & Wilson, M.E. (2009) Alterations in progesterone catabolic enzymes, CYP2C and CYP3A, in hepatocytes challenged with insulin and glucagon. *J. Anim. & Vet. Advances* 8(1):39-46.

- Kiess, A.S., Cleveland, B.M., Wilson, M.E., Klandorf, H. & **Blemings, K.P.** (2008) Protein-induced alterations in murine hepatic alpha-amino adipate delta-semialdehyde synthase activity are mediated posttranslationally. *Nutr. Res.* 28(12):859-865.
- Lemley, C.O., Koch, J.M., **Blemings, K.P.**, Krause, K.M. & Wilson, M.E. (2008) Concomitant changes in progesterone catabolic enzymes, cytochrome P450 2C and 3A, with plasma insulin concentrations in ewes supplemented with sodium acetate or sodium propionate. *Animal*.2(8):1223-1229.
- Cleveland, B.M, Kiess, A.S. & **Blemings, K.P.** (2008)  $\alpha$ -Amino adipate  $\delta$ -semialdehyde synthase mRNA knockdown reduces the lysine requirement of a mouse hepatic cell line. *J. Nutr.* 138:2143-2147.
- Benevenga, N.J. & **Blemings, K.P.** (2007) Unique aspects of lysine nutrition and metabolism. Proceedings of the International Amino Acid Workshop. Budapest, Hungary. *J Nutr.* 137(6 Suppl 2):1610S-1615S. Review.
- Costine, B.A., Inskeep, E.K., **Blemings, K.P.**, Flores, J.A. & Wilson, M.E. (2007) Mechanisms of luteal resistance to Prostaglandin F<sub>2</sub> $\alpha$  during maternal recognition of pregnancy in ewes. *Domestic Animal Endocrinology.* 32:106-121.
- Panaccione, D.G., Cipoletti, J.R., Sedlock, A.B., **Blemings, K.P.**, Schardl, C.L., Machado, C. & Seidel, G.E. (2006) Effects of Ergot Alkaloids on Food Preference and Satiety in Rabbits, as Assessed with Gene-Knockout Endophytes in Perennial Ryegrass (*Lolium perenne*). *J. Agric. Food Chem.* 54:4582-4587.
- Parsons, A.S., Buchanan, N.P., **Blemings, K.P.**, Wilson, M.E. & Moritz, J.S. (2006) Effect of corn particle size, pellet texture and feed form on broiler performance in the growing phase. *J. Appl. Poult. Res.* 15:245-255.
- Higgins, A.D., Silverstein, J.T., Wilson, M.E., Rexroad III, C.E. & **Blemings, K.P.** (2006) Starvation-induced alterations in hepatic lysine catabolism in different families of rainbow trout (*Oncorhynchus mykiss*) – *Fish Physiology and Biochemistry* 31:33-44
- Chapman, P.E. & **Blemings, K.P.** (2006) Improving Retention Rates in Biochemistry: A Quasi-Experiment. *Radical Pedagogy* 8(1).
- Smith, D.L., Stinefelt, B.M., **Blemings, K.P.** & Wilson, M.E. (2006). Diet-induced alterations in progesterone clearance appear to be mediated by insulin signaling in hepatocytes. *J. Anim. Sci.* 84:1102-1109.
- Penula, N., **Blemings, K.P.** & Fitch, C.W. (2006) Protein, phosphorus and vitamin E intakes are associated with blood lead levels among WIC infants in rural West Virginia. *Nutrition Research* 26:96-99.
- Silverstein, J.T., Hostuttler, M. & **Blemings, K.P.** (2005) Strain differences in feed efficiency measured as residual feed intake. *Aquaculture Research* 36:704-711.

Stinefelt, B.M., Leonard, S.S., **Blemings, K.P.**, Shi, X. & Klandorf, H. (2005) Free radical scavenging, DNA protection, and inhibition of lipid peroxidation mediated by uric acid. *Annals of Clinical and Laboratory Science*. 35:37-45.

**Manangi, M., Howeing, S.F.A., Engels, J.G., Higgins, A.D., Killefer, J., Wilson, M.E. & Blemings, K.P.** (2005) Lysine  $\alpha$ -ketoglutarate reductase and lysine oxidation are distributed in the extrahepatic tissues of chickens. *J. Nutr.* 105:81-85.

Machin, M., Simoyi, M.F., **Blemings, K.P.** & Klandorf, H. (2004) Effect of Dietary Protein on Plasma Uric Acid, Body Weight, and Oxidative Stress in Broilers. *Comparative Biochemistry and Physiology Part B* 137:381-388.

Holaskova, I., Lewis, G.L., Elliott, M., **Blemings, K.P.** & Dailey, R.A. (2004) Effect of Peptidoglycan-Polysaccharide Complex on Reproductive Efficiency and Mastitis in Sheep. *American Journal of Reproductive Immunology* 52:197-2003.

Stinefelt, B.M., Eya, J.C., Semmens, K.J. & **Blemings, K.P.** (2004) Effect of Diet and Strain on Growth and Performance in Hybrid Bluegill. *North American Journal of Aquaculture* 66:312-318.

Simoyi, M.F., Falkenstein, E., Van Dyke, K., **Blemings, K.P.** & Klandorf, H. (2003) Allantoin, the Oxidation Product of Uric Acid is present in Chicken and Turkey Plasma. *Comparative Biochemistry and Physiology Part B* 135:325-335.

Chaney, R.C., **Blemings, K.P.**, Bonner, J. & Klandorf, H. (2003) Pentosidine as a Measurement of Chronological Age in Wild Birds. *The Auk* 120(2):394-399.

Roy, C.N. , **Blemings, K.P.**, Deck, K.M., Davies, P.S., Anderson, E.L., Eisenstein, R.S., & Enns, C.A. (2002) Increased IRP1 and IRP2 RNA Binding Activity Accompanies a Reduction of the Labile Iron Pool in HFE-Expressing Cells. *J. Cellular Physiol.* 190:218-226.

**Blemings, K.P.**, Crenshaw, T.D., & Benevenga, N.J. (1998) Mitochondrial Lysine Uptake Limits Hepatic Lysine Oxidation in Rats Fed Diets containing 5, 20, or 60% Casein. *J. Nutr.* 128:2427-2434.

Eisenstein, R.S., & **Blemings, K.P.** (1998) Iron Regulatory Proteins, Iron Responsive Elements and Iron Homeostasis. *J. Nutr.* 128:2295-2298.

Chen, O.S., **Blemings, K.P.**, Schalinske, K.S., & Eisenstein, R.S. (1998) Dietary Iron Intake Rapidly Influences Iron Regulatory Proteins, Ferritin Subunits and Mitochondrial Aconitase in Rat Liver. *J. Nutr.* 128:525-535.

**Schalinske, K.S., Blemings, K.P., Steffen, D.W., Chen, O.S., & Eisenstein, R.S.** (1998) Iron Regulatory Protein 1 is Not Required for the Modulation of Ferritin and Transferrin Receptor Expression by Iron in a Murine Pro-B Lymphocyte Cell Line. *Proc. Natl. Acad. Sci. USA* 94:10681-10686.

**Blemings, K.P.**, Gahl, M.J., Crenshaw, T.D. & Benevenga, N.J. (1996) Recombinant Bovine Somatotropin Decreases Hepatic Amino Acid Catabolism in Female Rats. *J. Nutr.* 126:1657-1661.

**Blemings, K.P.**, Crenshaw, T.D. & Benevenga, N.J. (1994) Lysine alpha-ketoglutarate Reductase and Saccharopine Dehydrogenase are Located Only in the Mitochondrial Matrix in Rat Liver. *J. Nutr.* 124:1215-1221.

Benevenga, N.J., Gahl, M.J. & **Blemings, K.P.** (1993) Role of Protein Synthesis in Amino Acid Catabolism. *J. Nutr.* 123:332-336.

## Abstracts

Berg, L.E., Gatrell, S.K., Cleveland, B., Grimmett, J., Turk, P., Leeds, T., Weber, G., Semmens, K.J. & **Blemings, K.P.** EFFECTS OF GENETIC SELECTION AND FEEDING TECHNIQUES ON GROWTH OF RAINBOW TROUT *Oncorhynchus mykiss*. Aquaculture America 2013 meeting – accepted.

Gatrell, S.K., Grimmett, J., Berg, L.E., Barnard, J.T. & **Blemings, K.P.** Diet-induced alteration in lysine catabolism in pig liver. Experimental Biology Meeting, San Diego, Ca. 2012 – *FASEB J March 29, 2012 26:1013.4*

Berg, L.E., Gatrell, S.K., Cleveland, B.M., Grimmett, J., Leeds, T., Weber, G., Klandorf, H., Turk, P., Semmens, K.J. & **Blemings, K.P.** Effect of genetic and feeding strategies on growth of rainbow trout. Experimental Biology Meeting, San Diego, Ca. 2012 – *FASEB J March 29, 2012 26:651.7*

Gatrell, S.K., West, B.N., Engels, J.G., Berg, L.E., Barnard, J.T., Moritz, J.S. and **Blemings, K.P.** (2011) Production-cycle-related changes in indices of lysine catabolism in turkey liver. Experimental Biology Meeting. Washington D.C. *FASEB J. 25:983.27*

Berg, L.E., Gatrell, S., Engels, J., West, B., Moritz, J.S. and **Blemings, K.P.** (2011) Tissue Distribution of Lysine Metabolism in Commercial Turkeys. Experimental Biology Meeting. Washington D.C. *FASEB J. 25:983.29*

Wilmoth, T.A., Lemley, C.O., Koch, J.M., Engels, J., **Blemings, K.P.** & Wilson, M.E. (2010) Amino acid concentrations in fetal pigs on days 90 and 110 of gestation and their relationship to placental efficiency. SSR meetings. Milwaukee Wisconsin July/August 2010.

Gatrell, S.K., Berg, L.E., Barnard, J.T., Engels, J.G., Wilmoth, T.A., Barnes, K.M., Wilson, M.E. & **Blemings, K.P.** (2010) Lysine catabolism in pig tissues. *FASEB J. 2010 24:740.9* Experimental Biology Meetings (EB'10) Anaheim, Ca. April 2010.

Pomeroy, S.K., Williams, P.M., Webb, K.E. & **Blemings, K.P.** (2009) Alterations in the Mitochondrial Proteome in Broilers fed a Lysine-Deficient Diet. *FASEB J. 23:738.10* (Experimental Biology Meetings (EB '09) New Orleans, La. April 2009)

Cleveland, B.M., Weber, G.M., **Blemings, K.P.** & Silverstein, J.T., (2008) Effect of feed deprivation and insulin-like growth hormone on indices of protein degradation in rainbow trout (*Oncorhynchus mykiss*) AquaAmerica Meeting. February, 2009.

Pomeroy, S.K., Silverstein, J.T., Barrows, F.T., Cleveland, B.M. & **Blemings, K.P.** (2008) Effect of Dietary Lysine and Genetics on Indices of Energy and Protein Metabolism in Rainbow Trout. AquaAmerica Meeting. Orlando, Fl. February, 2008.

- Pomeroy, S.K., Silverstein, J.T., Barrows, F.T., Cleveland, B.M. & **Blemings, K.P.** (2008) The effect of dietary lysine and genetics on lysine metabolism and growth in rainbow trout. *FASEB J.* 2008 22:869.9
- Cleveland, B.M., Kiess, A.S., Seidel, G.E. & **Blemings, K.P.** (2007)  $\alpha$ -Amino adipate  $\delta$ -semialdehyde synthase mRNA knockdown reduces the lysine requirement of a mouse hepatic cell line. *FASEB J.* 21:354.3 (A162).
- Cleveland, B.M., Leonard, S.S., Klandorf H. & **Blemings, K.P.** (2007) Reducing urate oxidase mRNA alters the oxidative stress response in a mouse hepatic cell line. *FASEB J.* 21:732.34 (A821).
- Lemley, C. O., Koch, J.M., **Blemings, K.P.** & Wilson, M. E. (2007) Determination of insulin concentrations in sheep isocalorically supplemented with two different volatile fatty acids. *Journal of Animal Science* 85 (Supplement 2):
- Wilmoth, T. A., Lemley, C.O. , Koch, J.M., **Blemings, K.P.** & Wilson, M.E. (2007) Validation of a ruminant hepatocyte culture for assaying the activity of enzymes responsible for progesterone catabolism, cytochrome P450 (CYP) 2C and 3A. *Journal of Animal Science* 85 (Supplement 2)
- Lemley, C.O., Koch, J.M., **Blemings, K.P.** & Wilson, M.E. (2006) Insulin-induced alteration in progesterone catabolism in murine hepatocytes appears to be mediated by CYP3A13. *Society for the Study of Reproduction – Biology of Reproduction* –abstract #390 p. 159.
- Keiss, A.S., Stinefelt, B.M., Gentilin, A.J., Wilson, M.E., Klandorf, H. & **Blemings, K.P.** (2006) Lysine catabolism in chickens fed at or below their lysine requirement. - *FASEB J.* 20(5):A1042.
- Stinefelt, B.M., Cantrell, C.M., Kiess, A.S. & **Blemings, K.P.** (2005) RNA interference mediated decrease of  $\alpha$ -amino adipate  $\delta$ -semialdehyde synthase mRNA in a murine hepatic cell line. *FASEB J.* 19(4):A438-A439.
- Kiess, A.S., Stinefelt, B.M., Cantrell, C.M., Wilson, M.E., Klandorf, H. & **Blemings, K.P.** (2005) Lysine  $\alpha$ -Ketoglutarate Reductase Activity Appears to be Post-translationally Regulated in Mice Fed High Protein Containing Diets. *FASEB J.* 19(4):A438.
- Schenck, E.L. & **Blemings, K.P.** Contribution of lysyl oxidase to lysine catabolism in chickens. Undergraduate Research Day at the Capitol.
- Kiess, A.S., Stinefelt, B.M., Cantrell, C.M., Higgins, A.D., Wilson, M.E., Klandorf, H. & **Blemings, K.P.** (2004) Regulation of hepatic lysine  $\alpha$ -ketoglutarate reductase in mice fed high or adequate protein diets. *FASEB J.* 18:A539
- Higgins, A.D., Silverstein, J.T., Wilson, M.E., Rexroad III, C.E. & **Blemings, K.P.** (2004) The effect of genetics and starvation on lysine catabolism in rainbow trout (*Oncorhynchus mykiss*) liver. *FASEB J.* 18:A539
- Kiess, A.S., Baker, N.J., Parson, A.S., Moritz, J.S. & **Blemings, K.P.** (2003) Effect of feed form on lysine and nitrogen retention in broilers. *Poult. Sci.* 82(suppl. 1):71.

- Parsons, A.S., Moritz, J.S., **Blemings, K.P.** & Stinefelt, B.M. (2003) Effect of grain particle size and feed texture on broiler performance and carcass quality. *Poult. Sci.* 82(suppl. 1):26.
- Stinefelt, B.M., Leonard, S., Shi, X., Moritz, J.S., **Blemings, K.P.** & Klandorf, H. (2003) Protection of DNA and cellular membranes from reactive oxygen species mediated damage by uric acid and the effect of dietary induced changes in plasma uric acid on pulmonary hypertension syndrome (ascites) in broilers. *Poult. Sci.* 82(suppl. 1):83
- Engels, J.G., Manangi, M., McCall, C.M., Klandorf, H. & **Blemings, K.P.** (2003) Metabolic Adaptations in Lysine Metabolism of Chicks Fed Varying Levels of Dietary Lysine. *FASEB J.* 17:A734-A735.
- Stinefelt, B.M., Eya, J.C., Semmens, K.J. & **Blemings, K.P.** (2003) Diet and Strain Affect Growth, Feed Efficiency, and Retention of Nitrogen and Lysine in Hybrid Bluegill. *FASEB J.* 17:A331.
- Stinefelt, B.M., Leonard, S., **Blemings, K.P.**, Shi, X., Klandorf, H. (2003) Protection of DNA and cellular membranes from reactive oxygen species mediated damage by uric acid. *FASEB J.* 17:A1257.
- Kain, B., Porter, D., **Blemings, K.P.** & Klandorf, H. (2002) Dietary Potassium Oxonate Increases Uric Acid in Rat Plasma and Bronchoalveolar Lavage Fluid. *FASEB J.* 16:A963
- Machin, M., Simoyi, M.F., **Blemings, K.P.** & Klandorf, H. (2002) Effect of Dietary Protein on Plasma Uric Acid, Allantoin, and Oxidative Stress in Broilers. *FASEB J.* 16:A255.
- Holaskova I., **Blemings, K.P.**, Dailey, R.A., Elliott, M. & Lewis, G.S. (2002) Effect of peptidoglycan-polysaccharide complex (PG-PS) of streptococcal cell wall on reproductive efficiency and mastitis in sheep. *American Journal of Reproductive Immunology* 2002;47(6):Abs.II-P5, p361-362
- Manangi, M.K., Hoewing, S.F.A., Engels, J.G., **Blemings, K.P.** (2001) Extra-hepatic tissues contribute to lysine oxidation in chicks. *FASEB J.* A268
- Klandorf, H., Rathore, D.S., Iqbal, M., Shi, X., **Blemings, K.P.**, & VanDyke, K. (2000) Accelerated Tissue Aging and Increased Oxidative Stress in Broiler Chickens fed Allopurinol. *FASEB J.* 14:A215
- Enns, C.A., Roy, C.N., **Blemings, K.P.**, Deck, K.M., & Eisenstein, R.S. (2000) Stimulation of IRP1 activity in HFE expressing HeLa Cells. *FASEB J.* 14:A482
- Blemings, K.P.**, Clarke, S.L., & Eisenstein, R.S. (1999) Differential Effect of Hypoxia on RNA-binding and Phosphorylation of Iron Regulatory Proteins. *FASEB J.* 13:A209.
- Chen, O.S., Ross, K.L., Schalinske, K.L., **Blemings, K.P.** & Eisenstein, R.S. (1999) Differential Effect of Iron Status on Ferritin and Mitochondrial Aconitase Synthesis and Abundance: Relationship to Mitochondrial Function. *International Iron Meetings. Sorrento, Italy. May 21-28, 1999.*
- Blemings, K.P.**, Clarke, S.L., & Eisenstein, R.S. (1999) Hypoxia Differentially Effects RNA Binding by Phosphorylation State of Iron Regulatory Proteins. *International Iron Meetings, Sorrento Italy, May 21-28, 1999.*



**Blemings, K.P.**, & Eisenstein, R.S. (1998) Erythropoietin Specific Affects on Iron Regulatory Protein (IRP) 2 and Targets of IRP Action. *FASEB J.* 12:A820.

Schalinske, K.L., **Blemings, K.P.**, Steffen, D.W., & Eisenstein, R.S. (1997) Iron Regulatory Protein-1 is not necessary for Iron-dependent Regulation of Transferrin Receptor and Ferritin. International Iron Meetings, Saint-Malo, France. May 1997.

**Blemings, K.P.**, Ross, K.L., & Eisenstein, R.S. (1996) Effect of Phorbol Ester and Ionomycin on RNA-binding Activity of Iron Regulatory Protein (IRP) 1 and 2 in Murine Splenic Lymphocytes. *FASEB J.* 10:A1112

**Blemings, K.P.**, Ross, K.L., & Eisenstein, R.S. (1996) Changes in RNA-binding Activity of Iron Regulatory Proteins 1 and 2 in Proliferating Cells. The First Annual Meeting of the RNA Society. University of Wisconsin, May 1996. P. 62.

Gahl, M.J., **Blemings, K.P.**, Benevenga, N.J., & Crenshaw, T.D. (1994) Protein Synthesis, Lysine Oxidation, and Lysine  $\alpha$ -Ketoglutarate Reductase Activity in Female Rats Injected with Bovine Somatotropin. *J. Anim. Sci.* 72:A221.

**Blemings, K.P.**, Crenshaw, T.D., & Benevenga, N.J. (1993) Diurnal Variation in Hepatic Lysine Oxidation (Lys. Ox.) and Lysine  $\alpha$ -Ketoglutarate Reductase (LKR) Activity in Rats fed 5, 20, and 60% Casein Diets and Uptake of Lysine in Mitochondria from Rats fed 5 and 60% Casein Diets. *FASEB J.* 7:A393.

**Blemings, K.P.**, Crenshaw, T.D., & Benevenga, N.J. (1992) Kinetic Parameters of U-<sup>14</sup>C-L-Lysine Oxidation in Liver Homogenates from Rats Adapted to 5 or 60% Casein Diets. *FASEB J.* 6:A1943.

**Blemings, K.P.**, Crenshaw, T.D., Swick, R.W., & Benevenga, N.J. (1990) The Subcellular and Submitochondrial Location of Lysine  $\alpha$ -Ketoglutarate Reductase (L $\alpha$ KGR) and the Difference in L $\alpha$ KGR Activity and Lysine Oxidation in Mitochondria Suggest Transport control of Lysine Degradation. *J. Anim. Sci.* 68(Suppl. 1):109-110.

**Blemings, K.P.**, Crenshaw, T.D., Swick, R.W., & Benevenga, N.J. (1990) Response of Rat Hepatic Mitochondrial Lysine Oxidation (Lys. Ox.) Lysine- $\alpha$ -ketoglutarate Reductase (L $\alpha$ KGR) and Saccharopine Dehydrogenase (Sacdh) to 5, 18, or 60% Casein Diets. *FASEB J.* 4:A919.

**Blemings, K.P.**, Benevenga, N.J. Crenshaw, T.D., & Swick, R. (1989) does the Exclusive Mitochondrial Location of Lysine- $\alpha$ -ketoglutarate Reductase in Rat Liver Suggest Transport Control of Lysine Degradation? *J. Anim. Sci.* 67 (Suppl. 1):240-241.

#### **Extension articles – not refereed**

**Blemings, K.P.** July 2006– Using basic biochemistry to improve the efficiency of lysine use for protein synthesis - Special Supplement to the Moorefield Examiner. p. 4

Klandorf, H., Seamen, C., **Blemings, K.P.** & Stinefelt, B. July 2006. Reduction of oxidative stress in broilers enhances health and improves performance. Special Supplement to the Moorefield Examiner. p. 8

**Blemings, K.P.** July 2005–Special Supplement to the Moorefield Examiner.

**Blemings, K.P.** July 21, 2004– Understanding lysine degradation to enhance nutritional efficiency, reduce feed cost and nutrient contamination of the ecosystem. Special Supplement to the Moorefield Examiner.

**Blemings, K.P.** (2003) Moorefield Examiner

**Blemings, K.P.** (2002) Protein and amino acid metabolism. Poultry Voice. 2(2):10.

Crenshaw, T.D., Gahl, M.J., **Blemings, K.P.** & Benevenga, N.J. (1995) Cost of Additional Dietary Lysine Must Be Taken Into Account. Feedstuffs 67:13-16.

## Grants and Contracts

### Summary information for funded and pending grants

#### 1. West Virginia University Research Corporation

1.1 Senate Research Grant, WVU. \$8,973

Title: Quantification and Modulation of Lysine Oxidation in Chickens.

Authors: **Blemings, K.P.**

Summary: This grant provided initial support to assess lysine oxidation and LKR activity in different tissues of chickens. Using these funds we were able to work up the assays for LKR activity and lysine oxidation.

1.2 WVURC Program to Stimulate Competitive Research, WVU. \$36,000

Title: HPLC with Radioisotope Detection for Improving Efficiency of Nutrient Use.

Authors: **Blemings, K.P.**, Fitch, C.W., Klandorf, H., Kenney, P.B. & Killefer, J.

Summary: This grant provided funds that allowed for the acquisition of a Water HPLC system. The HPLC has been used heavily in the laboratory for both amino acid analysis and for the detection of antioxidants. This instrument has been another workhorse in the laboratory and has permitted several collaborations as well as enhancing the research infrastructure of the division and college.

1.3 WVURC Program to Stimulate Competitive Research, WVU. \$7,275

Title: Production of Antibodies to Chicken Liver Lysine  $\alpha$ -ketoglutarate Reductase

Authors: **Blemings, K.P.**

Summary: These funds were used to first try and isolate LKR protein from chicken liver. These attempts were unsuccessful and given that the mouse sequence was known, we generated peptide antibodies that have been very useful for western blotting but not for immunoprecipitation studies. These antibodies have been key in allowing us to develop several different collaborations.

1.4 WVURC Program to Stimulate Competitive Research, WVU. \$47,000

Title: Acquisition of a Real Time PCR Instrument

Authors: **Blemings, K.P.**, Verlinden, S.J., Killefer, J. & Panaccione, D.

Summary: Real time PCR is the latest and best available technology to measure mRNA levels for specific genes. I spearheaded the effort to obtain a real time PCR instrument for the college along with other investigators in Animal and Vet. Science as well as Plant and Soil Science. This instrument has been another workhorse in the laboratory and has permitted several collaborations as well as enhancing the research infrastructure of the division and college.

1.5 WVURC Program to Stimulate Competitive Research, WVU. \$5,775

Title: Acquisition of a Liquid Scintillation Counter

Authors: **Blemings, K.P.**, Wilson, M.E., Verlinden, S.J. & Mazik, P.M.

Summary: When I arrived at WVU I found myself using a liquid scintillation counter that was 18 years old and frequently non-functional. I spearheaded the effort to obtain a new liquid scintillation counter through funds acquired from the WVURC as well as the USDA/NRI. This effort involved 4 different investigators over three different divisions within the Davis College of Agriculture. This instrument has been heavily used by many groups and has permitted several collaborations as well as enhancing the research infrastructure of the division and college.

1.6 WVURC – Senate Research Grant, WVU. \$14,500

Title: Generation of a Full-length cDNA Clone of Lysine  $\alpha$ -ketoglutarate Reductase from Chicken Liver

Authors: **Blemings, K.P.**

Summary: The purpose of this grant was, as the name suggests, to obtain a full-length clone of chicken LKR. We tried three different strategies and were not successful. However, since the grant was funded the entire chicken genome has been sequenced and this will certainly be advantageous to us as we continue in our efforts to obtain the desired clone.

1.7 WVURC Program to Stimulate Competitive Research, WVU. \$31,576

Title: Modernization of Cell Culture Facilities

Authors: Wilson, M.E., Yao, J., Noueiry, A.O. & **Blemings, K.P.**

Summary: We have come to a stage of our research where it would be very advantageous to have a modern cell culture facility. The existing facility is quite antiquated and in need of replacement/repair. I again coordinated a multi-investigator effort to obtain funding to upgrade our cell culture facilities. Currently our group and one of the reproductive physiology investigators use the facilities and we look forward to upgrading the equipment in a few weeks.

1.8 WVURC , \$450-\$750 each

Title: Undergraduate Research Support

Authors: **Blemings, K.P.**

Summary: I have had a large number of undergraduate students pass through my laboratory and many have worked on their own projects. The WVU Research Corporation in conjunction with the University Honors program, make available on a competitive basis, a small amount of money for each of these projects. Thus far I have been able to obtain 5 such grants over the last 5 years.

1.9 WVURC, \$450 - \$550 each

Title: Travel grant support

Summary: On several occasions I have garnered support to offset the cost of attendance at different national meetings.

1.10 WVURC, \$20,580

Title: Enhancing the infrastructure to study RNA dynamics

Authors: Noueiry, A.O. & **Blemings, K.P.**

Summary: This grant provided funds to acquire the instrumentation for polysome analysis, a technique to be used by several members of the university community.

## 2. **Industry**

### 2.1 **British United Turkey of America - \$15,000 was my part**

Title: Effect of Early Nutrition and Management Practices on the Productive Performance, Carcass Composition, Microbial Colonization, Breast Blister Incidence and Formation, And Lysine Metabolism in Different Strains of Male and Female Turkeys

Authors: Kenney, P.B., Peterson, R., Klandorf, H., **Blemings, K.P.** & Warren, J.

Summary: This project was originally developed to be a multiyear project but BUTA decided to move their research to another facility. We used our funds to examine differences in measures of lysine oxidation in different strains and sexes of turkeys.

## 3. **USDA**

3.1 USDA/CSREES HATCH #WVA00413,

Title: Biochemical and Molecular Aspects of Lysine Degradation

Authors: **Blemings, K.P.**

Summary: This Hatch project is our umbrella project to investigate tissue and species specific aspect of lysine oxidation and its regulation. Because of the importance of lysine in animal nutrition we conducted and continue to conduct this important line of investigation.

3.2 USDA/NRI - \$14,000

Title: HPLC with Radioisotope detection for Improving the Efficiency of Nutrient Use

Authors: **Blemings, K.P.**, Fitch, C.W., Klandorf, H., Kenney, P.B. & Killefer, J.

Summary: This grant complements the WVURC grant of 9.1.2 by allowing for the acquisition of an in-line radioactivity detector.

3.3 USDA/CSREES - \$15,000, \$33,500, \$23,367, \$53,644

Title: Aquaculture Food Marketing and Development Project, FY 02,03,04,06

Authors: Multi-investigator

Summary: We received funding from this much larger multiinvestigator project for FY 2001 (AQ IV), FY 2002 (AQ V), FY 2003 (AQ VI) and FY 2006 (AQ IV). We have completed and published the work for AQ IV, V, and VI. The samples for AQ IX have been collected and are being analyzed. This overall project is to enhance the competitiveness of the West Virginia Aquaculture Industry.

3.4 USDA (WV Agriculture & Forestry Experiment Station) - \$6,500

Title: Tissue Specific Pathways of Lysine Oxidation in the Chicken

Authors: **Blemings, K.P.**

Summary: The experiment station made small pools of money available on a competitive basis on one occasion. We were able to obtain some of those dollars which we used to purchase a low-grade fluorometer. This fluorometer allowed us to work out an assay for lysyl oxidase. The fluorometer was later replaced with a much better instrument when I reached an agreement with a colleague in the Division of Plant and Soil Sciences.

3.5 USDA/NRI - \$11,500

Title: Acquisition of a Liquid Scintillation Counter

Authors: **Blemings, K.P.**, Wilson, M.E., Verlinden, S.J. & Mazik, P.M.

Summary: This is the USDAs matching portion.

3.6 USDA/NRI - \$75,000

Title: Development of Molecular Tools for Understanding Lysine Catabolism

Authors: **Blemings, K.P.**

Summary: We obtained this grant for three objectives. First, to use a proteomics approach to understand the regulation of lysine degradation in chickens. This objective is being completed in conjunction with Virginia Tech and is currently in progress. The second objective is to use small interfering RNAs (siRNAs) to knockdown expression of LKR mRNA in mouse cells. This work is in progress and we are currently testing several siRNAs and their effect on LKR expression. The third objective is to generate a real-time PCR assay for chicken LKR. This third objective is also in progress.

3.7 USDA/NRI - \$14,668

Title: Acquisition of a microarray hybridization station for the Division of Animal and Veterinary Sciences at WVU

Authors: Yao, J., Wilson, M.E., & **Blemings, K.P.**

Summary: This grant allowed acquisition of a hybridization station which is essential for performing microarray experiments. It is used in conjunction with the scanner in the division thus providing the necessary components for performing microarray experiments.